

The Postal Service Product Costing System  
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**A. INTRODUCTION**

Calculating product costs for the United States Postal Service is an important and challenging job. In the thirty plus years since reorganization, the Postal Service's product costing system has evolved to meet the needs of a large integrated multiproduct firm. Because of the unique economics of the Postal Service, standard costing methods are inapplicable and a sophisticated cost measurement system is required. The current Postal Service product costing system has a state-of-the-art analytical basis and develops the appropriate cost metrics for postal products. It has been extensively reviewed by outside evaluators and utilizes large data sets that reflect current activities and volumes.

**B. THE NATURE OF POSTAL COSTS**

To understand and evaluate the Postal Service's product costing system requires a basic familiarity with the nature of cost generation in postal services. There are four key characteristics of the Postal Service that determine what a good product costing system would be. They are:

**1. It is a service firm.**

Service firms face some different costing issues from manufacturing firms; in particular, they don't schedule production but must be ready to provide it upon demand. This uncertainty can give rise to common costs. For example, the time a clerk in a shoe store spends waiting for the next customer is not caused by the wingtips, or the loafers, or any other individual product. Similarly, the Postal Service must staff its receiving docks to be ready to unload trucks full of many classes of mail. This waiting time is not attributable to any specific class of mail.

**2. It is a multi-product firm with common production.**

The Postal Service produces many different products at the same time. One carrier does not deliver the letters while another delivers the flats. In some instances, common production does not affect cost generation. The fact that both First Class and Standard letters can be sorted together on a single bar code sorter might not cost any less than sorting each product on its own machine. But clearly, it is cheaper for a single mail handler to bring both products to the machine in one full container than it is to have two

different mailhandlers bring each product separately to the machine in its own half-full container.

### **3. It has a large network responsibility.**

As is well known, the Postal Service must stand ready to collect and delivery mail to about 140 million delivery points daily. Unlike a pizza or package delivery service which visits only a small proportion of its potential delivery points on a daily basis, the Postal Service delivers mail to 94% of those 140 million delivery points six days a week. This means that it must maintain a large network that could realistically serve every single delivery point on a given day. No other delivery service comes anywhere close to this reach. In addition, the Postal Service maintains a retail network of over 30,000 post offices diffused geographically across the country. But maintaining this large network has a large cost.

### **4. It has both economies of scale and economies of scope.**

Many studies, by a wide variety of analysts, have shown that Postal Service costs embody two technical characteristics: economies of scale and economies of scope. Generally speaking, economies of scale occur when the unit cost of providing a particular postal service declines as the amount provided increases. It is less expensive -- on a unit basis -- for a carrier to deliver a full bag of mail than one half empty. In addition, parts of postal production are subject to economies of scope. Again, the classic example is the letter carrier. It is undoubtedly cheaper for one carrier to carry the First Class letters and Standard A letter to your house than it is to have two separate carriers, one bringing the First Class letters and the other bringing the Standard A letters.

## **C. WHAT ARE THE APPROPRIATE METRICS FOR MEASURING POSTAL COSTS?**

Given the nature of postal costs, what are the appropriate cost measures? That is, what should the Postal Service's product costing system attempt to measure?

For example, the nature of postal production rules out using that traditional unit cost measure, average costs. If a carrier delivered only one product, like parcels, this measure would be appropriate. But in the multi-product Postal Service it loses its meaning. Suppose a carrier is delivering a large parcel that costs \$2.20 to delivery and letter that costs \$0.20 to deliver. The "average unit cost" of delivery is \$1.20, but this value is meaningless as it applies to neither the parcel nor the letter. Average cost fails as a measure of cost because it gives no indication of the cause of the cost. The

importance of causality in accurate product costing has been eloquently stated by the eminent economist, Prof. William Baumol:<sup>1</sup>

Our immediate objective is to determine what costs are attributable and in order to accomplish this we must first agree on the meaning of the term. It seems to me quite clear that a cost is ATTRIBUTABLE to some service, X, if and only if the cost is CAUSED by the supply of that service. (Emphasis in original)

How then to measure which costs are caused by services in a multi-product environment like the postal service? How do we find the costs of a single product like presorted post cards? The first step is to recognize that there are two distinct sets of costs. The first set includes those costs that would never arise if there were no presorted post cards but come into existence as soon as that product is provided. This set of costs can and should be attributed to presorted post cards. The other set of costs are those that will be incurred regardless of whether the presorted post card service is provided. None of these costs can be attributed accurately to presorted post cards. Accordingly, economists have developed cost concepts for measuring the costs caused by any individual product in a multiproduct firm and these are exactly the cost measurements included in the Postal Service's product cost system.

#### **D. THE POSTAL SERVICE PRODUCT COSTING SYSTEM**

The Postal Service's product costing system is highly sophisticated, with large underlying statistical measurement systems and a well developed mathematical basis. Although a detailed description of the system is beyond the scope of this testimony, a basic understanding can be gained by recognizing that the Postal Service's product costing system is essentially an advanced activity based costing (ABC) system.<sup>2</sup> In a standard ABC system, products costs are measured in four steps:

1. Assign resources to activities
2. Identify the cost drivers in each activity
3. Measure the attributable activity cost and its relationship to the drivers.
4. Distribute attributable activity costs to the products that cause them.

These four steps are followed in the Postal Service's product cost system:

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<sup>1</sup> See, Direct Testimony of William J. Baumol on Behalf of the United States Postal Service, Postal Rate Commission, Docket No. R90-1 Remand.

<sup>2</sup> It is important to avoid the confusion that often surrounds activity based costing systems and activity based management systems. The latter often rely upon the former but also include things like real time measurement systems. In its purest form, an activity based costing system is simply a method for measuring product costs.

1. Assign general ledger costs to cost pools.
2. Identify the drivers of cost in each cost pool.
3. Measure attributable cost for each cost pool and its relationship to the drivers.
4. Distribute attributable costs for each cost pool to the products that cause them.

For example, in the purchased highway transportation activity the four steps are implemented as follows. First, expenses for contract transportation are identified and assigned to relevant cost pools (long haul transportation, inter-facility transportation, etc.) Next, the cost driver is identified as cubic foot-miles of transportation. The relationship between activity cost and the cost driver is then measured by sophisticated econometric techniques. Statistical analysis of large data sets is used to determine the amount of cost to be attributed to products. Finally, a sophisticated product sampling system (TRACS) is used to distribute the attributable costs to individual products.

One reason the Postal Service's product costing system can be considered an *advanced ABC* system is that it recognizes the existence of substantial product group sustaining and business sustaining costs. In a multiproduct network industry, not all costs are caused by individual products. Product group sustaining costs are associated with the provision of a group of products but do not vary with increases and decreases in the amount of each product in the group. Business sustaining costs are associated with being an ongoing concern but do not vary with provisions in the level of service. For example the Postal Service incurs a cost to measure its product costs and provide them to the Postal Rate Commission. This cost does not vary with regular increases or decreases in mail volume. This would be a business sustaining cost.

The other interesting characteristic of the Postal Service product costing system is that it is vetted. The Postal Service's methods of attribution are reviewed by competitors, customers and the Postal Rate Commission. This is not to suggest that the Postal Service product costing system is solely a regulatory device. It is also used in running operations. Budgets for operating units are determined, in part, by the attribution methods used in the product costing system.

## **E. IS THE LEVEL OF ATTRIBUTION REASONABLE?**

The Postal Service product costing system attributes about 58 percent of costs to individual products and identifies the remaining 42 percent of costs as "institutional" or non-attributable. A natural question is whether or not this is a reasonable number that reflects the true nature of cost causality for postal services or whether it is the results of a deficiency in the product costing system. There are two ways to gain an answer to this question.

The first is to compare the result with similar systems for other firms in the industry. Because there is only one postal service in the United States, this must be done internationally. Canada Post Corporation also has a product cost system which is

based upon the advanced Activity Based Costing methodology. For the most recent fiscal year, 42 percent of Canada Posts Cost's were not attributed:

As a multi-service firm, Canada Post Corporation employs a common infrastructure to provide its various services in each of the four principal markets in which it operates. Canada Post Corporation has developed over many years, in conjunction with expert accountants and economists, an activity-based, incremental costing methodology that allocates costs among its services. It applies this methodology each period in its Annual Cost Study. The Annual Cost Study provides costing data that serves as the basis for ensuring that Canada Post Corporation is not competing unfairly by cross-subsidizing its competitive services with revenues from exclusive privilege services.

The methodology, which is summarized in the notes to the contribution analysis below, recognizes that some costs are caused by the provision of individual services or groups of services while others are common costs of Canada Post Corporation's infrastructure. As Canada Post Corporation further automates with common enterprise systems, invests in its common brand, and pushes further productivity gains, these common costs increase as a proportion of the total costs. Approximately 58% of the total non-consolidated costs of Canada Post Corporation are allocated to individual services or groups of services in the Annual Cost Study.

The other way to get a sense of whether the amount of institutional costs is reasonable is to examine their source. A review of the Postal Service Cost Segments and Components Report for Fiscal Year 2002 provides the activities in which the institutional costs arise. These costs can be aggregated into broad categories which reflect the activities in which they arise. The following table presents the categories along with the proportion of total institutional cost arising in each category.

### Sources of Institutional Cost

Sources	Percentage of Institutional Costs
<b>Network Costs</b>	<b>66.5%</b>
Carrier Network	37.9%
Retail Network	10.5%
Transportation Network	5.2%
Mail Processing Network	12.9%
<b>Non-Network Costs</b>	<b>33.5%</b>
Admin & Supplies	20.5%
Building Costs	5.5%
Other	7.5%

The table shows that institutional costs arise because of the large network responsibility of the Postal Service. Two-thirds of institutional costs come from network responsibilities and half of institutional costs come from the widespread retail and delivery networks.<sup>3</sup> No other delivery entity in the United States has a similar network responsibility and would be unlikely to have such large network costs. This table suggests that the level of attribution is consonant with the nature of production for the United States Postal Service.

#### **F. HOW CAN THE POSTAL SERVICE PRODUCT COST SYSTEM BE IMPROVED?**

The primary thing that comes to mind in improving the Postal Service product costing system would be to improve the scope of volume data that are collected. Right now the Postal Service focuses on measuring volume at the national level. It would be helpful to have more detailed volume flow information as well as measures of volumes within activity. Collecting such data may not be feasible without interfering with the process of providing service or it may be prohibitively expensive to collect. It would be useful, however.

#### **G. CAN A REASONABLE METHODOLOGY BE DEVELOPED SO THAT MORE COSTS ARE ATTRIBUTED TO SPECIFIC CLASSES OF MAIL?**

Sometimes there is a concern that an apparently low level of attribution is due to deficient methods or insufficient effort in tracing costs to products. Neither problem is the case here. Because the Postal Service product cost system has been vetted before the Postal Rate Commission for the past 30 years, both the Postal Service and interested parties have spent many millions of dollars investigating the level of attribution. While there are, of course, disagreements on the results for individual cost pools, there is general consensus on the methodology of cost attribution.<sup>4</sup>

Efforts to further attribute institutional costs without an underlying causal basis will necessarily lead to distortionary cost measurements. As the simple example presented in the appendix to this testimony shows, different “reasonable” methods for allocating institutional costs will give very different product cost measures. This means that such

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<sup>3</sup> In technical terms, these institutional network costs arise from three sources: (1) common fixed cost in network provision, (2) economies of scale or density in network provision and (3) economies of scope in network provision. The lion's share of the institutional cost comes from the carrier and retail networks where these sources are strong. The retail and delivery networks represent 34 percent of total cost but produce 48 percent of institutional cost.

<sup>4</sup> Not surprisingly, Postal Service competitors argue that the level of attribution is too low while Postal Service customers *simultaneously* argue that the level of attribution is too high.

an effort is quite likely to mislead people about the costs. The fact that the effort is known to produce misleading cost measurements should give one pause in suggesting a costing method whose goal is to increase attribution rather than to measure accurately the costs truly caused by postal products.<sup>5</sup>

**H. IF MORE COSTS ARE ATTRIBUTED, WHAT EFFECT WOULD THAT HAVE ON THE VOLUMES OF VARIOUS CLASSES OF MAIL? WHAT ARE THE RELATIVE ELASTICITIES OF THE VARIOUS CLASSES OF MAIL?**

The effect of increasing the attribution of cost to classes of mail depends upon the arbitrary method used to increase attribution. For example, suppose the method is to distribute institutional costs on the basis of relative volumes of mail. Then, the high volume classes would see their unit costs and, presumably, prices increase. This would mean that their volumes would fall relative to other products. If institutional costs were distributed equally across classes, then low volume classes would see their relative unit costs rise (institutional cost per piece would be high) and their relative volumes would fall. Finally, if institutional costs were distributed on relative attributable costs, then high cost classes would see their relative costs rise and their relative volumes fall.

It is difficult to predict the outcome of the effort without knowing the method. Turned around, this means that if one knew the outcome desired, one could move Postal Service product costs in that direction by strategically designing an arbitrary allocation scheme. Suppose one were a competitor with a low volume product like parcels. In that case, one could argue for an equal distribution of institutional costs in the hope of increasing the unit cost of parcels.

This vulnerability is not just theoretical and the proposed methods of allocation can be subtle. In a recent rate case a witness for the Newspaper Association of America (a competitor of Standard advertising mail) advocated calculating “weighted” volume variable cost where the weights for each are the percentage of total institutional costs divided by the percentage of volume variable costs within a function. This method distributes the institutional costs to products that occur in functions, like delivery, with relatively low rates of attribution. In this way, products which much of their cost in delivery get more institutional costs than other volume variable costs. The effect, of course, is to disproportionately increase the cost of Standard mail, which generates most of its cost in delivery, as much of it is presorted and dropshipped.

The impact of a price distortion on volume depends upon the relative elasticities. The higher the elasticity in absolute value, the greater the impact on volume of an artificially increased price. The relative elasticities are provided in the following table. In addition to affecting volume, distorting costs could also affect the financial performance of the Postal Service. When costs are distorted, contributions are also distorted. If the cost

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<sup>5</sup> Non-causal methods include distributing fixed costs on relative volumes, distributing fixed costs in proportion to revenue, distributing fixed costs in proportion to variable costs, or distributing fixed costs equally across products.

for a product is overstated, then it could appear that the product was not providing a positive contribution when it actually was. If the product apparently was not providing a positive contribution, the Postal Service would likely raise its price and consequently discourage its volume growth. However, because the product was really producing a positive contribution, the Postal Service would find itself in a position of falling volume and falling contribution. The more it tried to re-price this product, the worse its financial position would become.

### **Elasticities for Postal Products**

Product	Elasticity
First-Class Single-Piece Letters	-30.5%
First-Class Presort	-10.3%
First Class Cards	-84.0%
Priority Mail	-93.1%
Express Mail	-124.8%
Periodical Within County	-24.4%
Periodical Nonprofit	-25.4%
Periodical Classroom	-25.4%
Periodical Regular	-16.7%
Standard Regular	-35.1%
Standard ECR	-104.0%
Standard Nonprofit	-20.1%
Parcel Post	-98.3%
Bound Printed Matter	-28.5%
Standard Special Rate	-24.9%
Standard Library Rate	-24.9%



## Appendix

### Allocating Institutional Costs

Suppose that a mythical postal service, ReliablePost, had three products, letters, parcels and expedited parcels. The volume, rate and revenue information for the three products are given below:

	<b>Volume</b>	<b>Rate</b>	<b>Revenue</b>
Letters	7,000,000	\$0.60	\$4,200,000
Parcels	2,000,000	\$1.25	\$2,500,000
Expedited	1,000,000	\$4.00	\$4,000,000
All Products	10,000,000		\$10,700,000

ReliablePost is making \$700,000 in profit. Cost studies for ReliablePost show that 65 percent of the costs are attributable to products and 35 percent of costs are institutional. The costs are attributable to products as follows:

	<b>Attributable Cost</b>	<b>Institutional Cost</b>	<b>Contribution</b>
Letters	\$1,400,000		\$2,800,000
Parcels	\$1,600,000		\$900,000
Expedited	\$3,500,000		\$500,000
All Products	\$6,500,000	\$3,500,000	\$4,200,000

Note that ReliablePost's contribution exceeds its institutional cost by \$700 million, the amount of its profits. Also note that all products are contributing to defraying institutional costs and earning a profit.

Now suppose that institutional costs are allocated to products. We can examine three of the infinite number of ways such an allocation can be made. In the first, institutional costs are allocated equally to products:

Institutional Cost Allocated Equally				
	<b>Attributable Cost</b>	<b>Institutional Cost</b>	<b>Total Cost</b>	<b>Contribution</b>
Letters	\$1,400,000	\$1,166,667	\$2,566,667	\$1,633,333
Parcels	\$1,600,000	\$1,166,667	\$2,766,667	-\$266,667
Expedited	\$3,500,000	\$1,166,667	\$4,666,667	-\$666,667
All Products	\$6,500,000		\$6,500,000	\$700,000

This allocation method provides the same total profit as before, but the relative contribution signals are mixed. It appears as if ReliablePost is earning losses on its relatively low volume products, parcels and expedited letters and should exit those business lines. Of course, if it did, the cost of providing regular letters would increase dramatically as it would be the only product left to contribute to paying for institutional costs.

It is important to emphasize that this is just one of many outcomes. Two other examples are provided. In the first, institutional costs are allocated on the basis of volume and in the second institutional costs are allocated on the basis of relative attributable cost.

**Institutional Cost Allocated on the Basis of Relative Volumes**

	<b>Attributable Cost</b>	<b>Institutional Cost</b>	<b>Total Cost</b>	<b>Contribution</b>
Letters	\$1,400,000	\$2,450,000	\$3,850,000	\$350,000
Parcels	\$1,600,000	\$700,000	\$2,300,000	\$200,000
Expedited	\$3,500,000	\$350,000	\$3,850,000	\$150,000
All Products	\$6,500,000	\$3,500,000	\$10,000,000	\$700,000

**Institutional Cost Allocated on the Basis of Relative Attributable Cost**

	<b>Attributable Cost</b>	<b>Institutional Cost</b>	<b>Total Cost</b>	<b>Contribution</b>
Letters	\$1,400,000	\$753,846	\$2,153,846	\$2,046,154
Parcels	\$1,600,000	\$861,538	\$2,461,538	\$38,462
Expedited	\$3,500,000	\$1,884,615	\$5,384,615	-\$1,384,615
All Products	\$6,500,000	\$3,500,000	\$10,000,000	\$700,000

The main point to be made is that all of these methods are reasonable, yet they each provide a very different picture of product cost and contribution. Although one can pick the one that seems “most” reasonable (based upon one’s own preferences) there is no assurance that it is accurate.